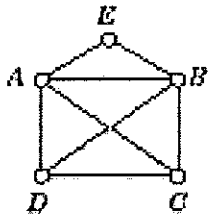
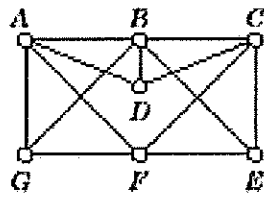


5.1

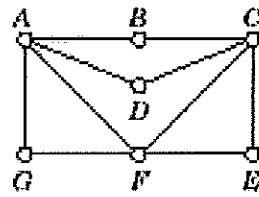
Planar:



Graph 1



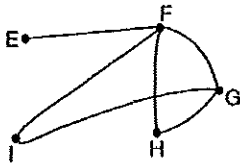
Graph 2



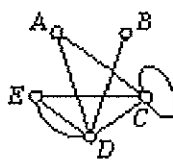
Graph 3

Tell if each of the following graphs are planar. If so, redraw the graph.

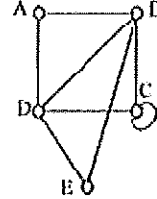
1.



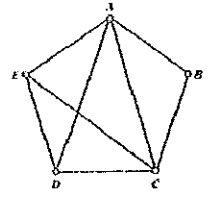
2.



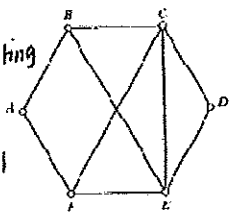
3.



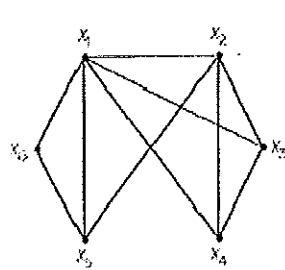
4.



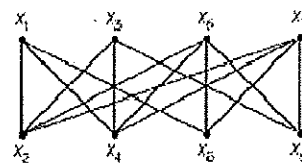
5.



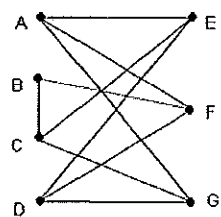
6.



7.



8.



9.

K_3

10.

K_4

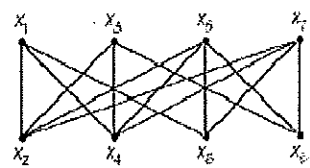
11.

K_5

12.

K_6

Bipartite graph:



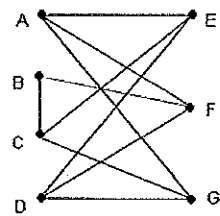
a. $K_{2,3}$

b. $K_{3,3}$

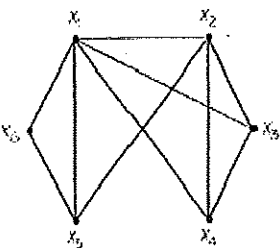
c. $K_{4,3}$

Subgraph:

a.

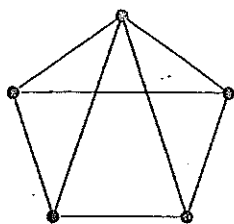


b.

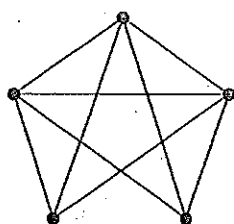


Is the graph planar? If so, redraw it.

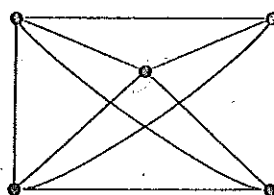
1.



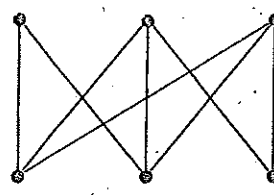
2.



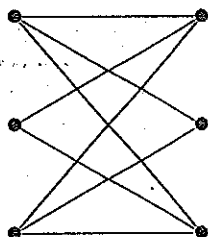
3.



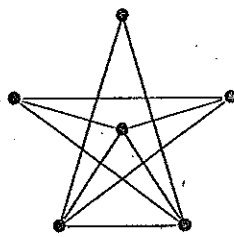
4.



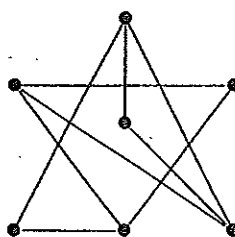
5.



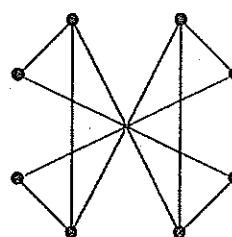
6.



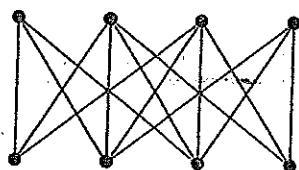
7.



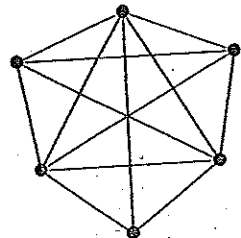
8.



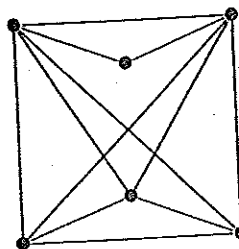
9.



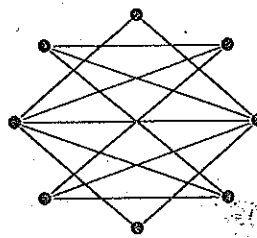
10.



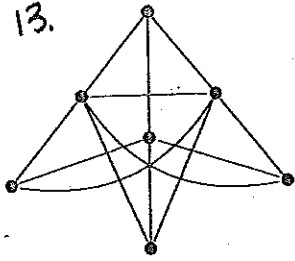
11.



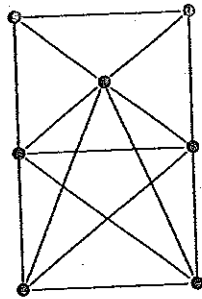
12.



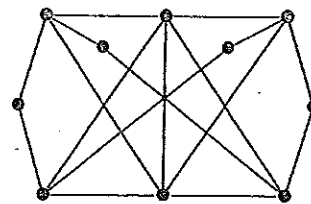
13.



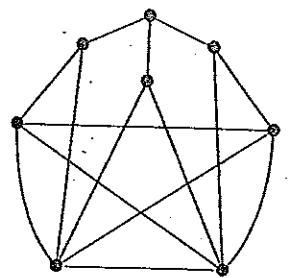
14.



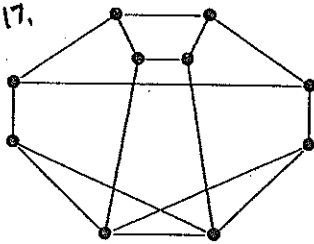
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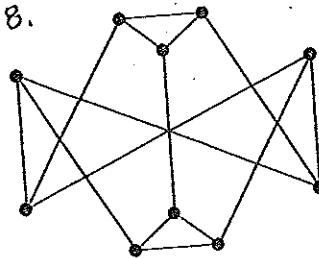
16.



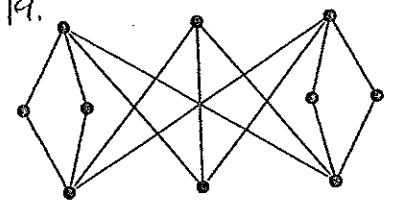
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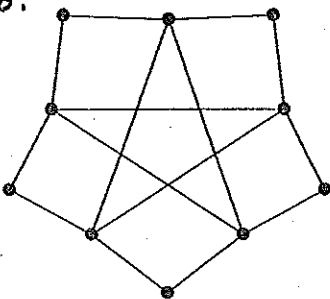
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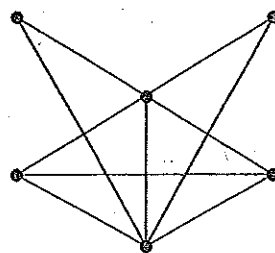
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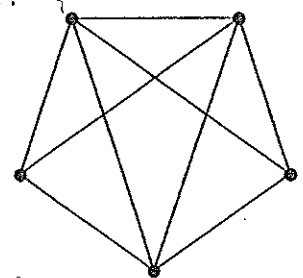
20.



21.



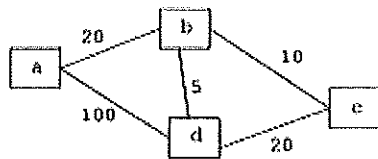
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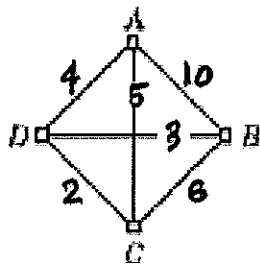
5.2 Traveling Salesman Problem

Brute Force Method:

1.



2.



3. Distances Between Cities:

		1	2	3	4
1 Atlanta GA			347	418	201
2 Raleigh NC		347		580	257
3 Tampa FL		418	580		595
4 Jonesville VA		201	257	595	

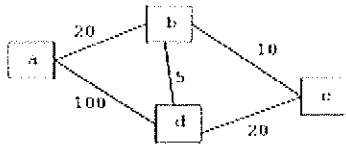
4.

	Boston	Buffalo	Chicago	Columbus	Louisville
Boston	*	446	963	735	941
Buffalo	446	*	522	328	532
Chicago	963	522	*	308	292
Columbus	735	328	308	*	209
Louisville	941	532	292	209	*

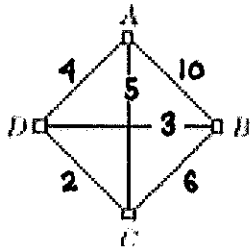
5.2 Traveling Salesman Problem

Nearest Neighbor Method:

1.



2.



3. Distances Between Cities:

	1	2	3	4
1 Atlanta GA		347	418	201
2 Raleigh NC	347		580	257
3 Tampa FL	418	580		595
4 Jonesville VA	201	257	595	

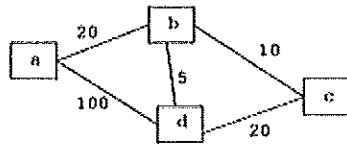
4.

	Boston	Buffalo	Chicago	Columbus	Louisville
Boston	*	446	963	735	941
Buffalo	446	*	522	326	532
Chicago	963	522	*	308	292
Columbus	735	326	308	*	209
Louisville	941	532	292	209	*

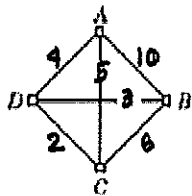
5.3 Traveling Salesman Problem

Shortest Path Method:

1.



2.



3. Distances Between Cities:

		1	2	3	4
1 Atlanta GA			347	418	201
2 Raleigh NC		347		580	257
3 Tampa FL		418	580		595
4 Jonesville VA		201	257	595	

4.

	Boston	Buffalo	Chicago	Columbus	Louisville
Boston	*	446	963	735	941
Buffalo	446	*	522	326	532
Chicago	963	522	*	308	292
Columbus	735	326	308	*	209
Louisville	941	532	292	209	*